

began about 6 P.M. on November 26, lasting through the night, and were repeated the two following nights, beginning a little later each night. Our own evidence of the solar calm at this time is nearly complete, and shows that no spot appeared on the surface of the Sun between the middle of October and the middle of December; and the absolutely complete daily record of the solar surface given in the Greenwich volume of 1889 from observations at the Royal Observatory, and those of India and the Mauritius, show the same complete calm. It must, therefore, be considered certain that, whatever connection there may be between some sun-spots and our magnetic disturbances, the one is not the cause of the other, and there are causes of the one which do not affect the other. At present we can go no further than admit that there may be some common cause of both phenomena, and that at one time the Earth is more within its reach than the Sun; at another, the Sun is nearer to its influence than the Earth. This common cause may be some form of cosmical stuff crossing our planetary system. There might be times in our history when we encounter it in greater quantities, and these times might occur periodically. We should then have greater and more frequent solar disturbances, and greater and more frequent magnetic storms, but not necessarily synchronously. This periodicity seems to be true, for we find more magnetic disturbances at periods of greater solar activity.

We are in need of other evidence of the existence of this cosmical stuff, and herein is our weakness. If it exists, we are too near it to see it. Many of the cloud forms which grace our skies would vanish into apparent nothingness on a near approach to them. We are probably too near the Zodiacal light to make much of our observations of its behaviour, and so this cosmical stuff would, if it actually exists, elude our notice.

Stonyhurst College Observatory:
1894 November.

Photographs of the Nebulæ H I. 84, h 1442, and H II. 344 Comæ Berenicis. By Isaac Roberts, D.Sc., F.R.S.

The photograph of the nebulae H I. 84, h 1442, and H II. 344 Comæ Berenicis, R.A. $12^h 45^m$, Decl. north $26^\circ 5'$, was taken with the 20-inch reflector on 1894 May 7, with exposure of the plate during 90 minutes, and the two copies now presented are enlarged, one to 1 millimetre to 24 seconds of arc, and the other to the scale of 1 millimetre to 6 seconds of arc.

The nebula H I. 84 is No. 4725 in the *New General Catalogue*, and 3249 in the *General Catalogue*, where it is described by Sir J. Herschel as very bright; very large; extended; very suddenly very much brighter in the middle, with a bright nucleus.

Lord Rosse (*Observations of Nebulae and Clusters of Stars*, p. 121) records six observations of the nebula between 1850 and 1867, and describes it as another spiral with two arms and some stars in the *following* arm; the centre is bright; 12 minutes *preceding* and a little *south* is another nebula (*h* 1442) elongated; and 30 minutes *north following* is a third, elongated *north* and *south*.

The nebula ($\text{H I. } 84$) is by Lord Rosse described as very large and very bright. The centre itself is like an elongated nebula with nucleus. This centre is enveloped in an irregular ring or rings of nebulous light, and he gives a rough marginal sketch of it.

The nebula *h* 1442 is described as very patchy and a faint nucleus suspected, with one faint star south of it.

The photograph shows the nebula $\text{H I. } 84$ to be a symmetrical ellipse and not a spiral, with the major axis in *north following* to *south preceding* direction, and the nucleus is a nebulous star of about 12th magnitude. Both the star and the nebulosity surrounding it have well-defined margins, the nebulosity having a ringlike boundary. Surrounding the nucleus, at a great distance, is a well-defined ring, but deformed on the *north following* side, and in the ring are involved several starlike condensations of nebulosity. Outside this ring is another faint ring symmetrical with it, but discontinuous on the *north following* side, and there is in it some evidence of nebulous condensations; there is also some indication of the existence of another very faint ring outside this. In the divisions between the rings are five well-defined stars of 15th to 16th magnitude, that may or may not be physically connected with the nebula. Several of the features which I have referred to must have been observed by Lord Rosse.

The nebula *h* 1442 is 54 seconds of time *preceding* $\text{H I. } 84$, and has a stellar nucleus surrounded by nebulosity which is elongated nearly in *north* and *south* direction, and has two faint condensations involved. It is a small, faint, elliptical nebula.

The nebula $\text{H II. } 344$ is $1^{\text{m}} 18^{\text{s}}$ *following*, and 17 minutes of arc *north* of 84, and has a small bright stellar nucleus and dense nebulosity elongated in *north following* to *south preceding* direction. There are two faint starlike condensations of nebulosity *south preceding* the nucleus.

Photograph of the Nebulae $\text{H I. } 143$ and $\text{II. } 536$ Virginis.

By Isaac Roberts, D.Sc., F.R.S.

The photograph of the nebulae $\text{H I } 143$ and $\text{II } 536$ *Virginis*, R.A. $12^{\text{h}} 55^{\text{m}}$, Decl. $3^{\circ} 4'$ north, was taken with the 20-inch reflector on 1894 April 9, with exposure of the plate during three hours, and the copy now presented is enlarged to the scale of 1 millimetre to 6 seconds of arc.